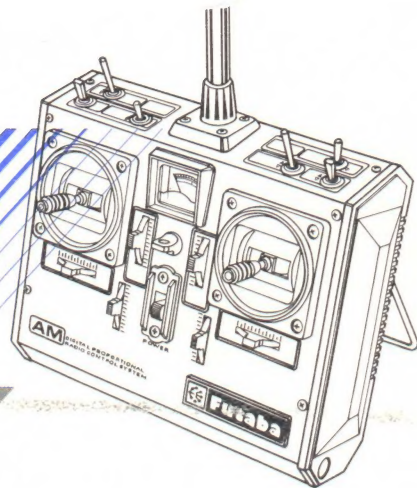


# Futaba

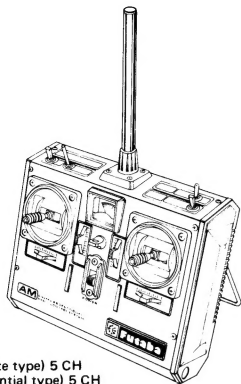
## DIGITAL PROPORTIONAL RADIO CONTROL

### OPERATION MANUAL

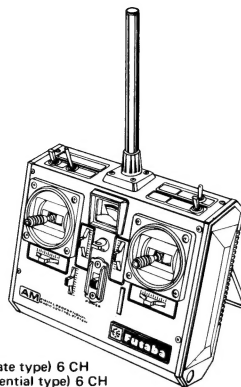
FP-7FG 7ch. FP-6FG 6ch. FP-5FG. 5ch.



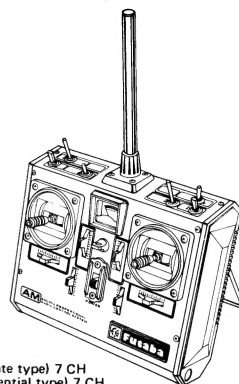
**FUTABA** CORPORATION OF AMERICA  
**FUTABA** CORPORATION



FP-5FG/K (Dual-rate type) 5 CH  
FP-5FG/E (Exponential type) 5 CH



FP-6FG/K (Dual-rate type) 6 CH  
FP-6FG/E (Exponential type) 6 CH



FP-7FG/K (Dual-rate type) 7 CH  
FP-7FG/E (Exponential type) 7 CH

## CONTENTS

• FEATURES . . . . .	① ~ ②	• Throttle ATL (Adjustable Throttle Limiter) . . . . .	①
• CONPOSITION AND SPECIFICATIONS . . . . .	② ~ ③	• Trim lever is used for fine adjustment . . . . .	①
• TRANSMITTER FP-T5FG . . . . .	④ ~ ⑦	• STICK MECHANISM AND ITS ADJUSTMENT . . . . .	②
• TRANSMITTER FP-T6FG . . . . .	⑤	• Transmitter antenna housing pocket . . . . .	②
• TRANSMITTER FP-T7FG . . . . .	⑦ ~ ⑧	• RECEIVER FP-R7H & SERVO FP-S28 . . . . .	③
• CHARGING OF TRANSMITTER AND RECEIVER NI-CAD BATTERIES . . . . .	⑨	• INSTALLATION AND HOW TO HANDLE . . . . .	④ ~ ⑤
• TRAINER . . . . .	⑩	• Futaba Digital Proportional Frequencies . . . . .	⑥
• ADJUSTMENT OF AILERON ELEVATOR & RUDDER DUAL-RATES OR EXPONENTIALS . . . . .	⑪ ~ ⑬	• FP-S26 & FP-S26G EXPLODED VIEWS . . . . .	⑥ ~ ⑦

Thank you for purchasing a Futaba digital proportional radio control set. Please read manual thoroughly before using the set.

### IMPORTANT:

An FCC Class "C" License is required to operate this system. Write to the Federal Communications Commission as listed below for an application form #505.

## **\*FEATURES OF TRANSMITTER:**

---

- Newly designed case and new open gimbal stick with adjustable tension and lever head.
- Aileron to rudder mixing (FP-T7FG) is ideal for giant scale and quarter scale models and gliders.
- Rudder from/to elevator mixing (FP-T7FG) is ideal for V-tailed aircrafts and gliders.
- Main channel servo reverse switches (FP-T5FG, T6FG, T7FG), are very convenient whenever reversing is necessary.
- Aileron and elevator dual rate on/off (FP-5FG/K, FP-6FG/K), plus rudder dual on/off (FP-7FG/K).
- Aileron and elevator Exponential on/off (FP-5FG/E, FP-6FG/E), plus rudder Exponential on/off (FP-7FG/E).
- Aileron, elevator, and rudder ATVs (Adjustable Travel Volume) (FP-T7FG) permit independent left or right, (up or down) adjustments to attain precise alignment as desired.
- Trainer system offers an easy training of flight for beginners.
- Adjustable Throttle Limiter (ATL) for throttle (FP-T5FG, T6FG, T7FG).

## **\*RECEIVER FP-R7H:**

---

- A compact, lightweight, rugged 7-channel receiver virtually invulnerable to power supply voltage changes thanks to new Futaba Custom I/C, IR-2501.
- Newly designed AGC circuit minimizes interference and dead points.
- High quality fiber glass through-hole printed circuit board secures soldering for shock and vibration.
- Three-wire gold-plated mini block connector is compatible with all Futaba servos.

### \*SERVO FP-S28:

- Extremely tough fiberglass reinforced Poly Butylene Terephthalate (PBT) case is both strong and fuel-resistant.
- Futaba custom IC improves the starting torque. Even though a power-saving type IC is used, output torque is 3.5 kg-cm (48.7 in-oz), the highest of any servo in its class.
- Futaba's original potentiometer indirect drive system improves vibration and shock resistance noticeably and extends the life of the servo substantially.
- Three-wire gold-plated 3P mini connector.
- Polyacetal resin ultra-precision gears, the strongest and the most accurate ensure precise neutral and eliminate backlash.

### \*COMPOSITION AND SPECIFICATIONS

#### COMPOSITION:

Model	FP-5FG	FP-6FG	FP-7FG
Transmitter	FP-T5FGx1	FP-T6FGx1	FP-T7FGx1
Receiver	FP-R7Hx1		
Servo	FP-S28x4		
Nicad Batt.	NR-4C		
Switch	SWH-2		
Others	Charger, Ext. cord, Servo tray, Spare horn, Ribbon, Hook band		

## SPECIFICATIONS:

---

### TRANSMITTER (FP-T5, 6, 7FG)

---

Operating system . . . . .	T5FG/K: 2-stick, 4 switches (dual-rate) T5FG/E: 2-stick, 4 switches (exponential) T6FG/K: 2-stick, 4 switches, 1 lever (dual-rate) T6FG/E: 2-stick, 4 switches, 1 lever (exponential) T7FG/K: 2-stick, 6 switches, 2 levers with MIX (dual-rate) T7FG/E: 2-stick, 6 switches, 2 levers with MIX (exponential)
Operating frequencies . . . .	27MHz band, 72MHz to 76MHz
Modulation system . . . . .	AM (Amplified modulation)
Power requirement . . . . .	9.6V, Nicad battery (NT-8H)
Current drain . . . . .	150mA max.

---

### RECEIVER (FP-R7H)

---

Receiving frequencies . . . .	27MHz band, 72MHz to 76MHz
IF amplifier frequency . . . .	455 kHz
Selectivity . . . . .	3kHz/-3dB
Range . . . . .	550 yards (500m) on the ground, 1100 yards (1000m) in the air.
Power requirement . . . . .	4.8V, Nicad battery (NR-4C), common with servo.
Current drain . . . . .	4.8V, 10mA
Dimensions . . . . .	1.6 x 2.6 x 0.8 inch (41 x 69 x 21 mm)
Weight . . . . .	1.7 oz. (50g)

---

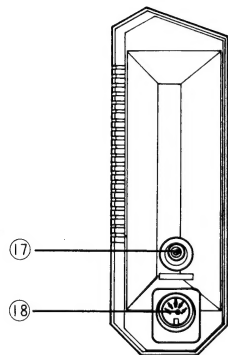
### SERVO (FP-S28)

---

Control system . . . . .	+pulse width control
Operating angle . . . . .	One side 45 min. (including trim)
Power requirement . . . . .	4.8 — 6.0V
Current drain . . . . .	6.0V, 8mA (when stopped)
Output torque . . . . .	48.7 oz-in (3.5 kg-cm)
Dimensions . . . . .	1.6 x 0.8 x 1.6 inch (40.5 x 20 x 40.5 mm)
Weight . . . . .	1.87 oz (53g)

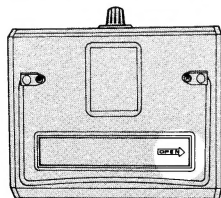
# **\*TRANSMITTER FP-T5FG:**

**Left side**



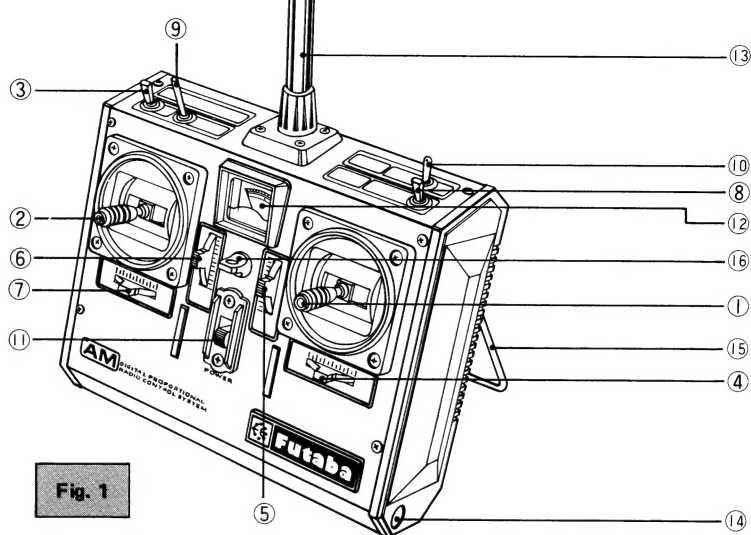
**Fig. 2**

**Opening the trimmer panel**



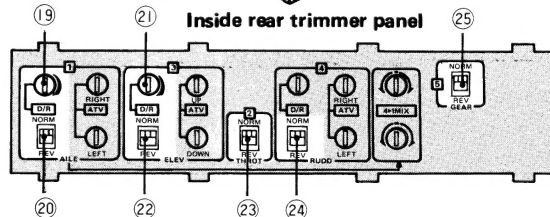
**Fig. 4**

**Open by pulling in the arrow direction.**



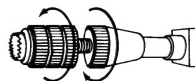
**Fig. 1**

**Inside rear trimmer panel**



**Fig. 3**

**Set to the desired length by turning the knob, then lock.**



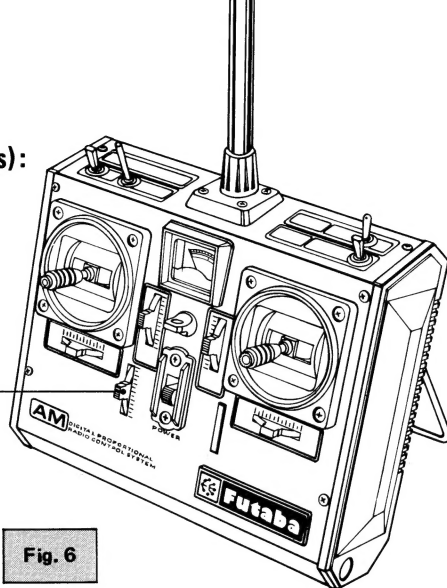
**Fig. 5**

**Adjustable lever head.**

- ① Aileron, elevator stick
- ② Throttle, rudder stick
- ③ CH5 landing gear switch
- ④ Aileron trim
- ⑤ Elevator trim
- ⑥ Throttle trim with ATL (Adjustable Throttle Limiter)  
This trim lever is effective only at the throttle stick LOW side.
- ⑦ Rudder trim
- ⑧ Aileron dual-rate or exponential on/off switch
- ⑨ Elevator dual-rate or exponential on/off switch
- ⑩ Trainer switch  
Pull on/self-off switch. The transmitter connected by the trainer cord (M-TC) operates and when it is OFF, your own transmitter only operates.
- ⑪ Power switch
- ⑫ Square level meter indicates the transmitter output power and indirectly shows power supply voltage.
- ⑬ Antenna
- ⑭ Antenna storage
- ⑮ Handle/stand
- ⑯ Hook for neck strap
- ⑰ Transmitter NiCad battery charging jack
- ⑱ Trainer cord socket
- ⑲ Aileron dual-rate or exponential trimmer  
adjusts the aileron travel when the ⑧ aileron dual-rate or exponential on/off switch is ON.  
Travel adjustment ranges 40 to 100%
- ⑳ Elevator servo reverse switch  
reverses the direction of the aileron servo.
- ㉑ Elevator dual-rate or exponential trimmer  
adjusts the elevator travel when the ⑨ elevator dual-rate or exponential on/off switch is ON.
- ㉒ Elevator servo reverse switch  
reverses the direction of the elevator servo.
- ㉓ Throttle servo reverse switch  
reverses the direction of the throttle servo.
- ㉔ Rudder servo reverse switch  
reverses the direction of the rudder servo.
- ㉕ Landing gear servo reverse switch  
reverses the direction of the landing gear servo.

**\*TRANSMITTER FP-T6FG**  
**(addition to FP-T5FG controls):**

②⑥

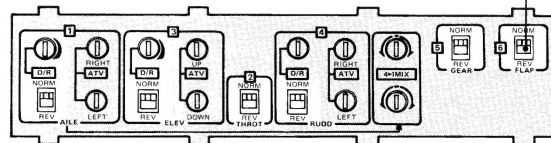


**Fig. 6**

②⑥ 6th CH lever  
 Use for flaps, etc.

②⑦ 6th CH servo reverse switch  
 Reverses the direction of operation of the CH6 servo.  
 Other controls are identical to those of the FP-T5FG.

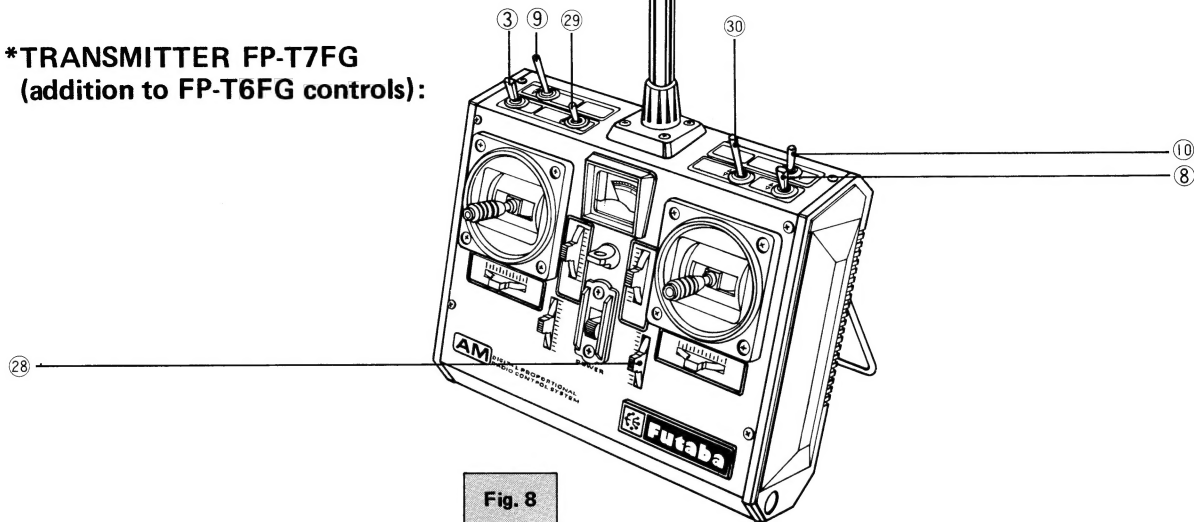
②⑦



**Fig. 7**



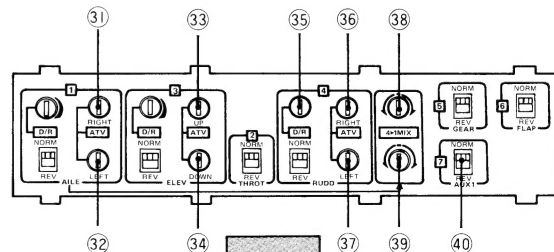
**\*TRANSMITTER FP-T7FG**  
**(addition to FP-T6FG controls):**



**Fig. 8**

③ ⑧ ⑨ and ⑩ are identical to those of the FP-T5FG.

②⑧ 7th CH lever



**Fig. 9**

- ②⑨ Rudder-elevator MIX (mixing)  
 Rudder-aileron MIX (mixing) } 3-position selector switch

- ★ When this switch is set to the rudder-elevator MIX position, rudder and elevator mixing is performed. The mixing ratio is fixed at 1:1. This is used with V-tail aircraft. In this case, two servos are used, one for the left and the other for the right.
- ★ When set to the aileron-rudder MIX position, aileron and rudder mixing is performed. Trimmers ③⑧ and ③⑨ adjust the mixing amount and direction.

③⑩ Rudder dual-rate or exponential on/off switch.

③① ③② Aileron ATV (Adjustable Travel Volume) trimmer.

③① RIGHT is for the right aileron and ③② LEFT is for the left aileron.

The servo travel volume is independently adjustable to the left and right from the neutral position.

Travel adjustment ranges 0 to 100%

③③ ③④ Elevator ATV trimmer

③③ UP is for up and ③④ DOWN is for down.

The adjustment range is same as the aileron ATV.

③⑤ Rudder dual-rate or exponential trimmer adjusts the rudder travel when the ③⑩ rudder dual-rate or exponential on/off switch is ON.

③⑥ ③⑦ Rudder ATV trimmer.

The adjustment range is same as the aileron ATV.

③⑧ ③⑨ Aileron-rudder MIX trimmer

Adjust the mixing amount and the mixing direction from the aileron to the rudder. After aircraft linkage is completed adjust the MIX direction and amount with trimmers.

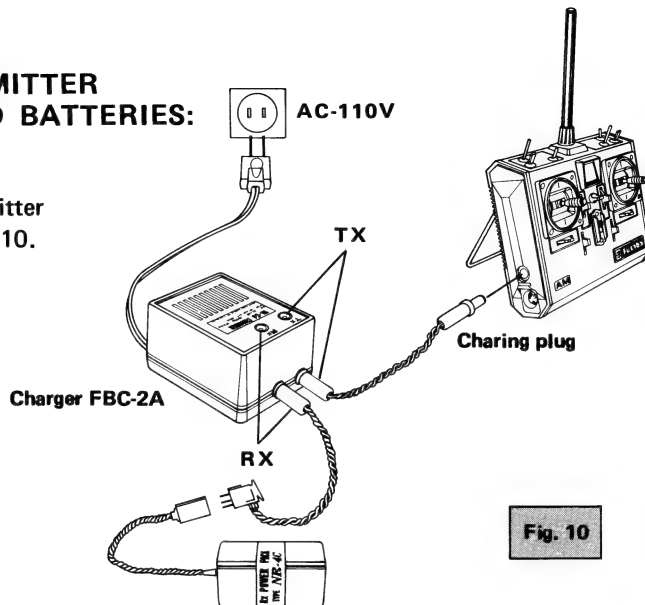
MIX amount adjustment ranges 0—100% each, the same adjustment can be done even if the servo is reversed.

④⑩ 7th CH servo reverse switch

reverses the direction of the 7th CH servo.

## **\*CHARGING OF TRANSMITTER AND RECEIVER NI-CAD BATTERIES:**

Recharge the receiver and transmitter  
Ni-Cad batteries as shown in Fig. 10.



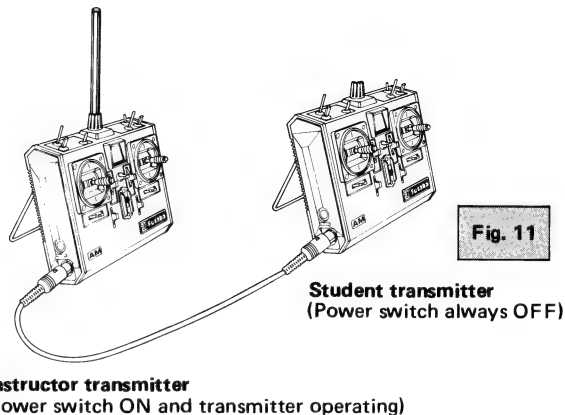
**Fig. 10**

- Connect the charging plug of the FBC-2A charger to the transmitter charging jack, connect the 3P connector of the FBC-2A to the receiver Ni-Cad battery (NR-4C), and plug the FBC-2A to a 110VAC outlet as shown in this figure. The TX and RX charging LED light; indicating that the batteries are being charged.
- The Receiver battery can be used about 10 times at 10 minutes per flight between rechargings.
- Charge the batteries for about 15 hours. When the set is not in use for some time, repeat discharge and charge, two to three times before use. (If the batteries are not used for a long time, their capacity will go down).
- FBC-2A charges transmitter and receiver Ni-Cad batteries independently or simultaneously.

## \*TRAINER

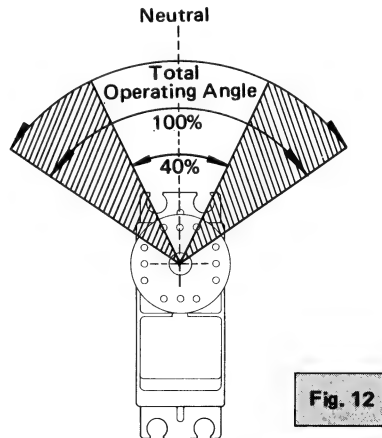
Connect the transmitters with the trainer cord (M-TC, purchased separately) as shown in Fig. 11.

When the switch is in the ON (pull) position, the student's transmitter operates and when the switch is in the OFF position, the instructor's transmitter operates. The transmitter at which the trainer switch is operated on-off becomes the instructor's.



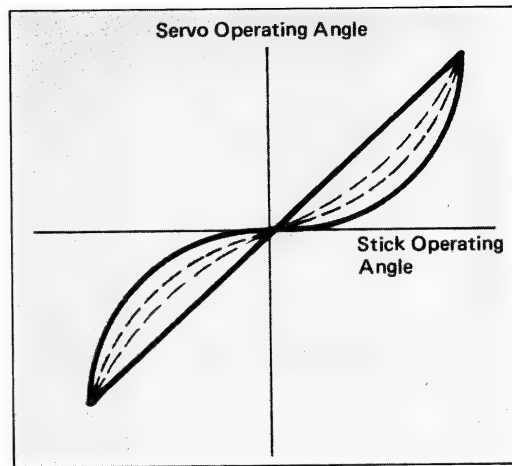
## \*ADJUSTMENT OF AILERON, ELEVATOR & RUDDER DUAL-RATES (K-TYPE):

When the dual-rate switch is set to ON position, servo operating angle becomes small (within the range indicated by the hatched lines in Fig. 12). The servo operating angle can be adjusted from 40% (minimum) to 100% (maximum) by the trimmer provided on the back panel of the transmitter. The dual-rate switch should be normally set to OFF. However, when the larger operating angle is required like the spin, etc., set it to ON and adjust the horn and trimmer for level flight. When dual-rate switch is set to OFF, the servo operating angle becomes larger.



## **\*ADJUSTMENT OF AILERON, ELEVATOR & RUDDER EXPONENTIALS (E-TYPE):**

When switch is set to ON, servo operating angle shifts on exponential curve per Fig. 13. Exponential curve can be adjusted by trimmer on the back panel of the transmitter. Normal servo movement is back at the OFF position.



**Fig. 13**

## **\*Throttle ATL (Adjustable Throttle Limiter)**

ATL is a new device that trims only at the LOW side of the throttle stick. It has almost no effect at the high side.

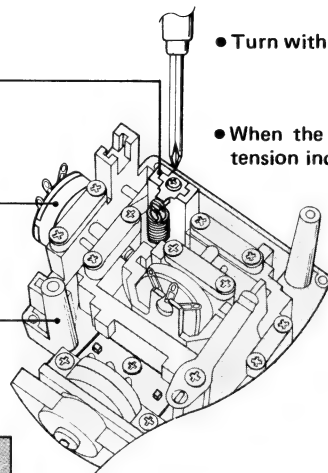
If the throttle rod is set at the engine HIGH side, the LOW side can be adjusted to any desired position with the trim lever. The trim lever has almost no effect to the HIGH side, which is, convenient for set-up.

## **\*Trim lever is used for fine adjustment.**

The trim lever is used for neutral position adjustment or correction of the posture of the aircraft after installation is completed. However, after test flight, try to keep the neutral position as they are making necessary corrections with the rod adjusters, etc.

## \*STICK MECHANISM AND ITS ADJUSTMENT

- The new gimbal is open. This one has been used only for the most expensive radio controls. It also has the built-in tension adjustment mechanism on open gimbal for the first time. You can adjust tension of spring for your best stick feeling.
- CP variable resistor improved the neutral characteristics and resolution tremendously.
- All molded parts made of high-grade polycarbonate that virtually eliminates the effects of temperature and humidity.



- Turn with a Phillips screwdriver.
- When the core rises, the spring tension increases.

Fig. 14

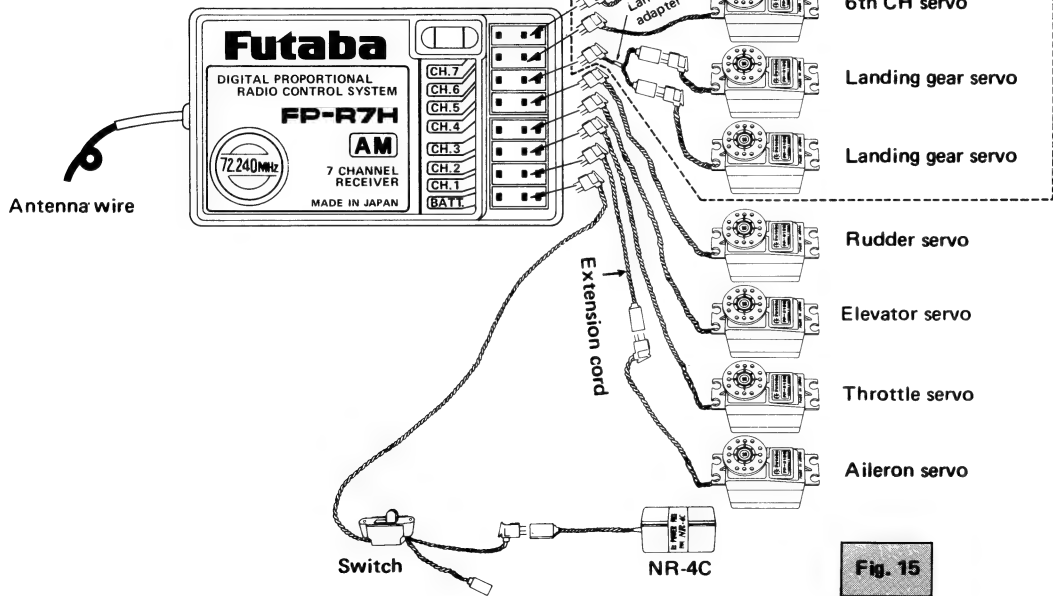
## \*Transmitter antenna housing pocket

This opening is used for storage of the antenna while carrying the transmitter. It is located at the bottom right side of the transmitter.

# **\*RECEIVER FP-R7H & SERVO FP-S28:**

7-channel AM receiver FP-R7H

Receiver crystal



The items circled by dotted line must be purchased separately.

**Fig. 15**

- Connect the servos, switch, and Ni-Cad battery as shown in Fig. 15.
- Extend the transmitter and receiver antennas to their full length and set the transmitter and receiver power switches to ON, transmitter first.
- Operate the sticks, switches, and levers of the transmitter and make sure that the servos follow those transmitter operations.

## **\*INSTALLATION AND HOW TO HANDLE:**

- After connecting the pushrods to the servos, check that the direction of the servo installed matches the direction of the transmitter stick movement.

If the servo operates in the opposite direction, reverse its direction with the servo reverse switch.

- Operate each servo to its full operating angle and check if the pushrod is binding or loose. Unnecessary force due to poor installation of the servo will adversely affect the servo and drain the battery quickly.

Always set the operating range of each function of aircraft somewhat larger than the full stroke (including trim adjustment) of the servo, adjust the pushrod(s) as needed so that the servos operate smoothly even when the trim lever and stick are operated simultaneously in the same direction.

- When installing a switch harness, cut a rectangular hole somewhat larger than the full stroke of the switch and install the switch so that it moves smoothly from ON to OFF. When the switch is to be mounted inside of the fuselage and to be turned ON and OFF with wire, make opening the same as described above.

Install the switch at the location where it will not come into direct contact with the engine oil, dust, etc.

- Be alert for noise. If the engine vibrations cause metal parts to touch, noise will be created and the receiver and servos may be affected by this noise. We recommend the use of noiseless parts.

- Wrap the receiver and its Ni-Cad battery in sponge to protect them against engine vibrations.

- Even though the receiver antenna might be too long for your installation, do not cut or dundle it.

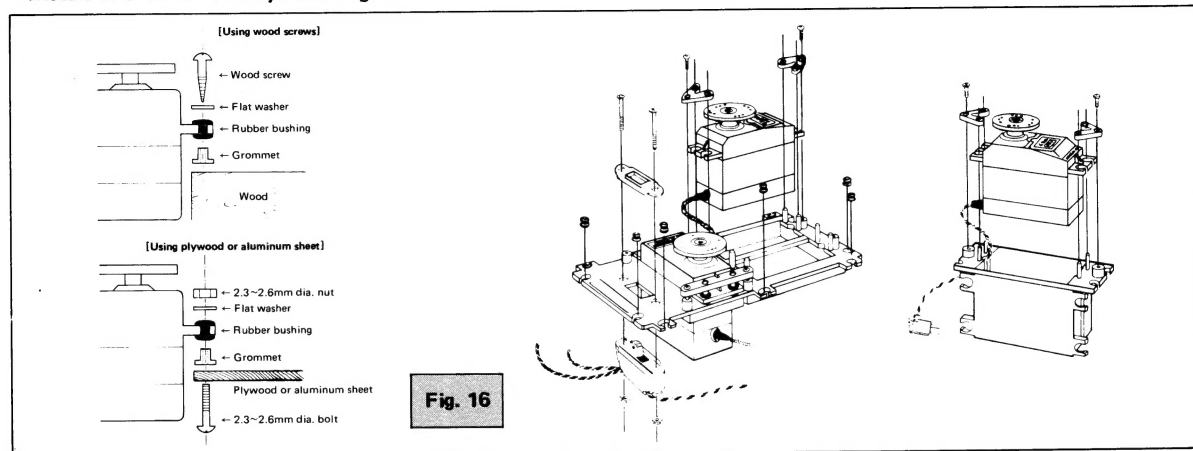
Run the antenna wire as straight as possible.

- Place the receiver and its Ni-Cad battery in a plastic bag and wrap a rubber band around the open end of the bag to prevent the entry of dust and water.

After use, remove the receiver and its Ni-Cad battery from the plastic bag to prevent evaporation.



- Install the servos firmly. See Fig. 16.



- A spare servo horn is supplied in the package. Use it as needed. Do not forget to install the tooth washer when changing the horn.
- Futaba 3-wire servos can be used with any Futaba radio control set. (Except the J Series). Select them to meet your particular need.
- After installation is complete, and each part has been rechecked, then extend the transmitter antenna as short as possible, extend the receiver antenna fully, and operate the set from a distance of 22 to 33 yards (20m to 30m) to check range.

The movement of each servo should follow the operation of each stick of the transmitter.

- After installation and checking are completed, it might be a good idea to take your model to the shop where you purchased it, or to an experienced radio control modeler and ask them to tell you how to handle your radio control set correctly and to inspect your set-up before you run it.

## Futaba Digital Proportional Frequencies

Band (1)	26.995MHz	Brown
Band (2)	27.045MHz	Red
Band (3)	27.095MHz	Orange
Band (4)	27.145MHz	Yellow
Band (5)	27.195MHz	Green
	• 72.080MHz	Brown/White
	72.160MHz	Blue/White
	• 72.240MHz	Red/White
	72.320MHz	Violet/White
	• 72.400MHz	Orange/White
	72.960MHz	Yellow/White
	• 75.640MHz	Green/White
	• Aircraft use only.	

- The frequency of Futaba digital proportional sets can be changed among bands (1)~(5) on the 27MHz band only.
- However, a 27MHz band set cannot be changed to 72MHz band, and vice versa.
- Therefore, always attach the correct frequency flag to the end of the transmitter antenna. Each frequency band has its own designated color, as stated above. The frequency flag is intended for identification purposes.
- Also change the frequency flag when changing the crystal.
- Futaba paired crystals are precisely matched. Always use a Futaba crystal set (transmitter, receiver) when changing the frequency.
- It is illegal to change crystals of transmitter on the 72-76 MHz bands in the U.S.A.

## FP-S28 EXPLODED VIEW:

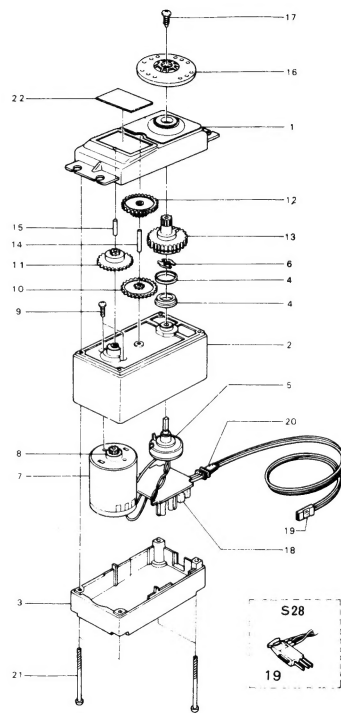
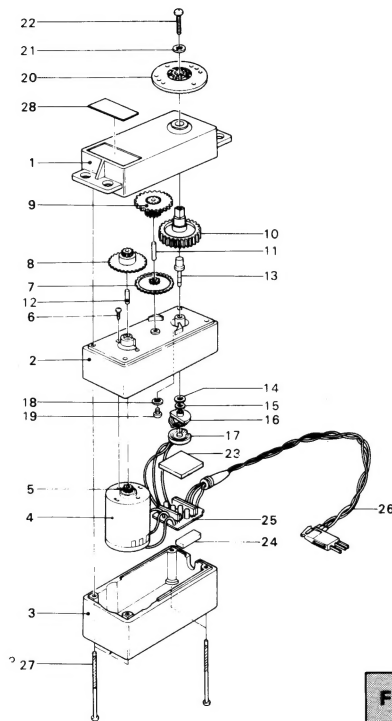


Fig. 17

No.	Part name	Part No.
1	Upper case	FCS-28
2	Middle case	
3	Bottom case	
4	Metal bearing	S 04134
5	Potentiometer	i 39995
6	Potentiometer drive plate	S 02753
7	Motor	S 91212
8	Motor pinion	S 02461
9	Screw 2×3	J 50002
10	1st gear	FGS-28
11	2nd gear	FGS-28
12	3rd gear	FGS-28
13	Final gear	FGS-28
14	Intermediate shaft	S 02495
15	2nd shaft	S 02494
16	Servo horn D	FSH-6W
17	Binding head tapping screw 2.6×8	FSH-41
18	Printed wiring board	AS1202
19	S128.....3PB-WRB300	FPC-8M
20	S 28.....with 3PC cord	FPC-3M
21	w/gum bush	S 90045
22	Pan head truss screw	J 50400
23	Nameplate	S 80700

## FP-S26G EXPLODED VIEW

### Landing gear servo



No.	Part Name	Part No.
1	Upper case	FCS26G
2	Middle case	FCS26G
3	Bottom case	FCS26G
4	Motor Assembly	AS2429
5	Motor pinion	SO2461
6	Screw 2 x 3	J50002
7	1st stage gear	FGS26G
8	2nd stage gear	FGS26G
9	3rd stage gear	FGS26G
10	Final stage gear	FGS26G
11	Intermediate shaft	SO2495
12	2nd stage shaft	SO2494
13	Output shaft	SO2803
14	Wave washer	S11043
15	Push nut	J60070
16	Slider	I40002
17	VR body	I39999
18	Fiber washer 2.3 m/m	S90332
19	Screw, truss 2 x 5	J52012
20	Servo horn	FSH-4W
21	2 m/m toothed washer	FSH-31
22	Screw, binding head tapping 2 x 8	FSH-31
23	Neo-cel sponge	S90336
24	Neo-cel sponge	S90333
25	Printed wiring board	AS1196
26	Sx cord M3P	FPC-3M
27	Screw Phillips panhead 2 x 35	J50091
28	S26G Name Plate	S80660

Fig. 18